Economics 442
Macroeconomic Policy
Lecture 9
2/20/2024

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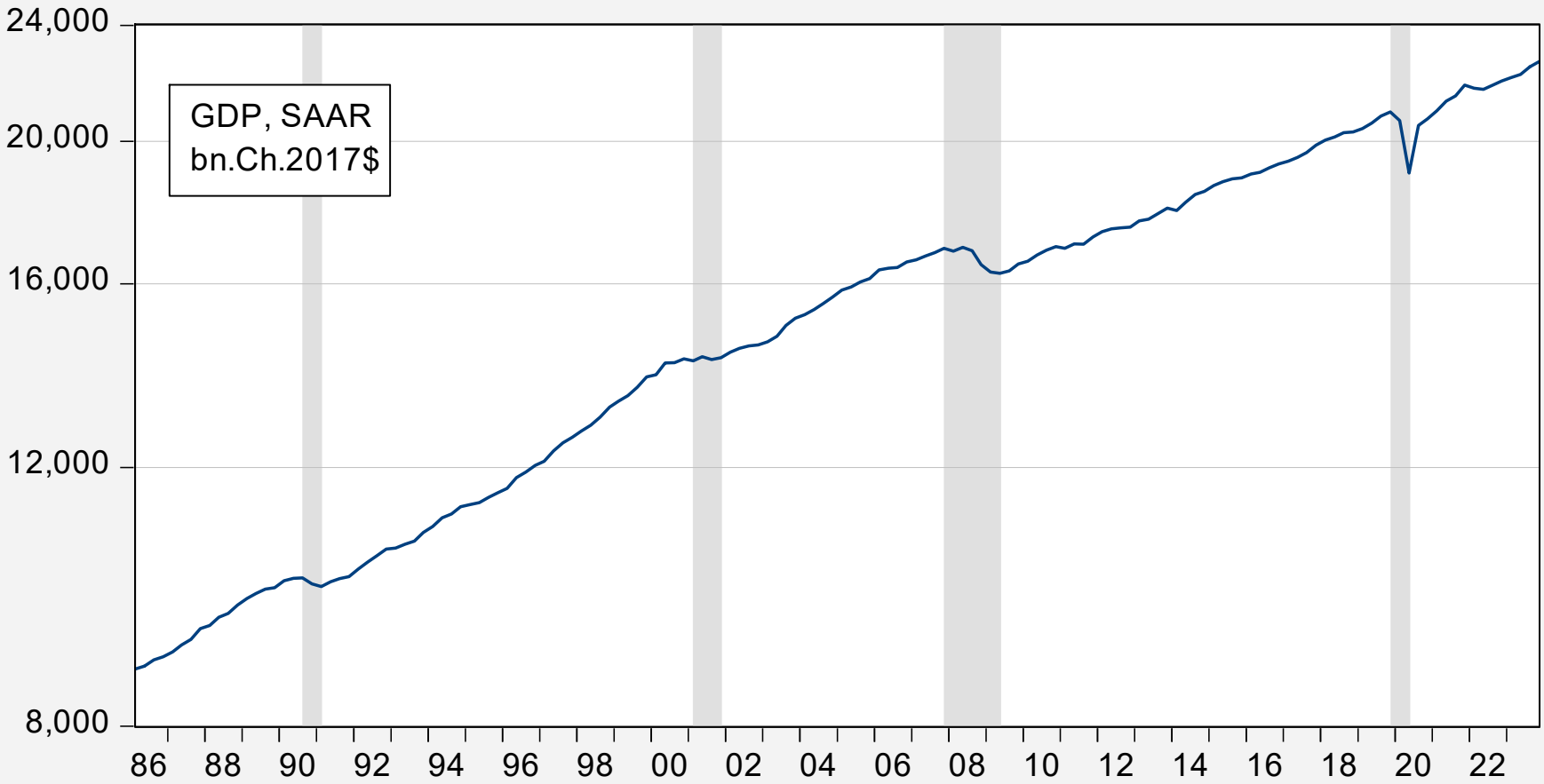
UW Madison
Spring 2024

v. 18.Feb.2024

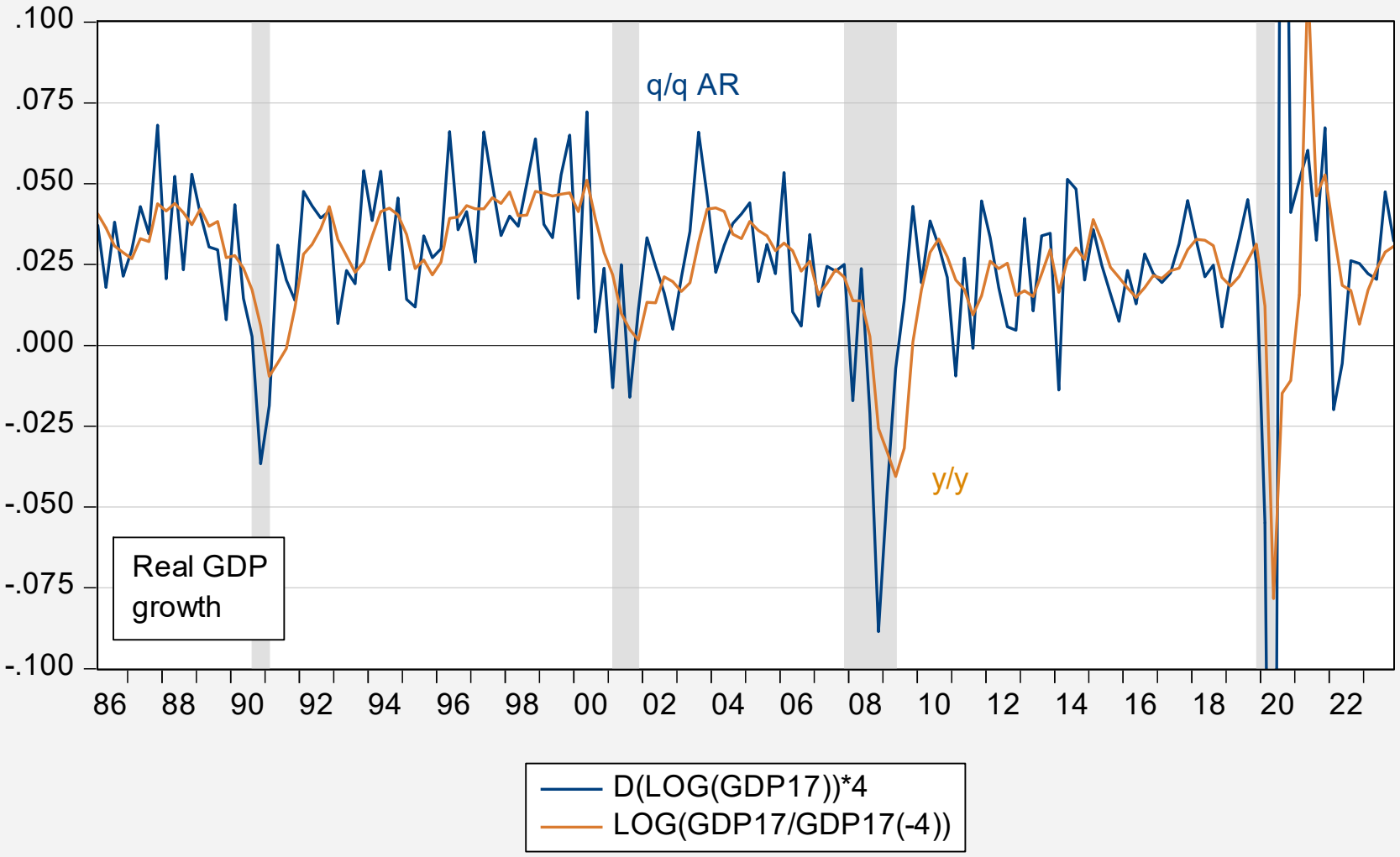
Outline

- Recession vs. output gap
- Real time recession detection
- Recession in Europe?
- Output gap measurement
- Early Warning Systems (Handout)

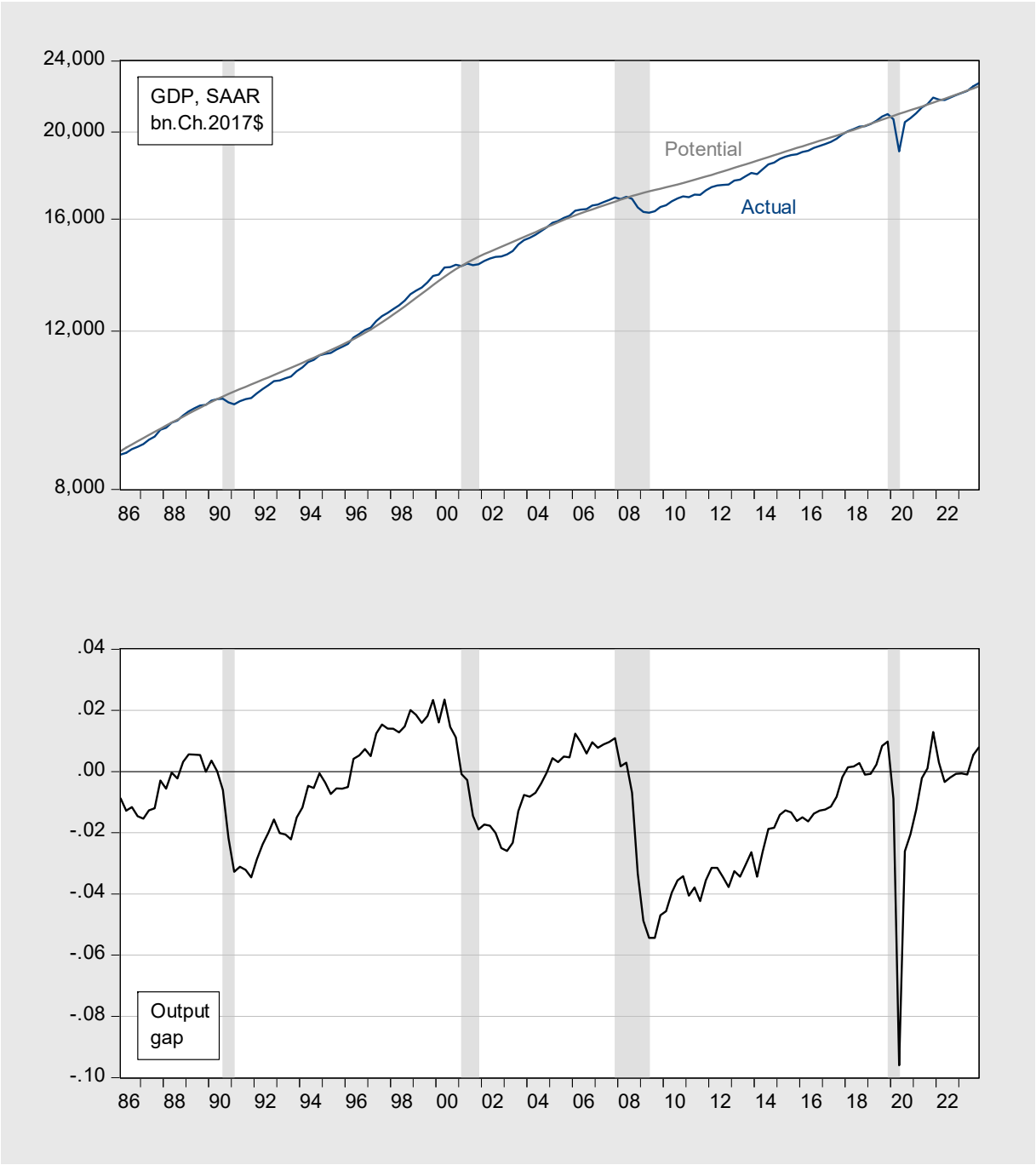
What's a Recession?



What's a Recession: Growth Rates



What's Not a Recession: Output Gap



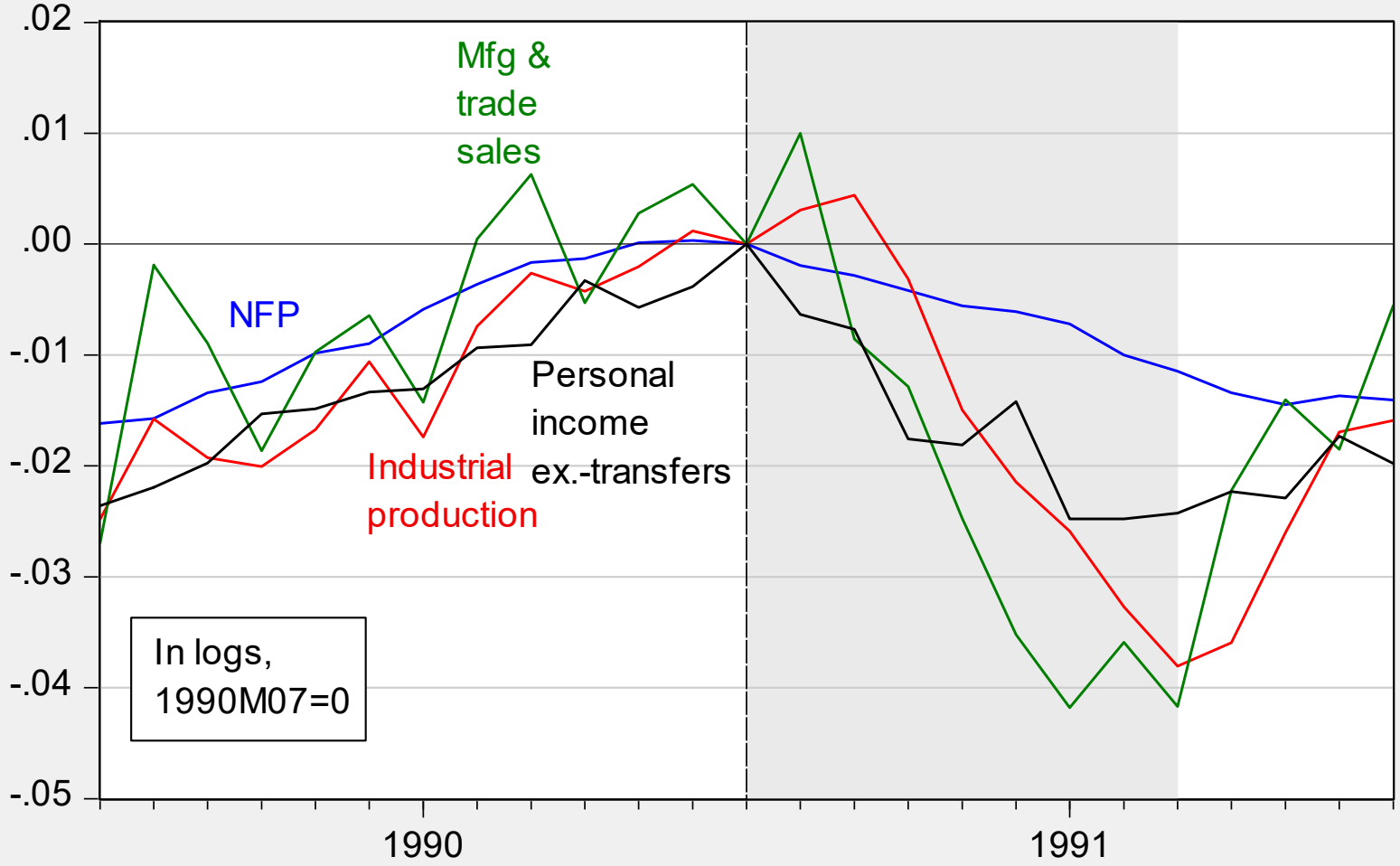
NBER Definition of a Recession

. A recession is the period between a peak of economic activity and its subsequent trough, or lowest point. Between trough and peak, the economy is in an expansion. Expansion is the normal state of the economy; most recessions are brief. However, the time that it takes for the economy to return to its previous peak level of activity or its previous trend path may be quite extended. According to the NBER chronology, the most recent peak occurred in February 2020. The most recent trough occurred in April 2020.

The NBER's definition emphasizes that a recession involves a significant decline in economic activity that is spread across the economy and lasts more than a few months. In our interpretation of this definition, we treat the three criteria—depth, diffusion, and duration—as somewhat interchangeable.

https://www.nber.org/research/business-cycle-dating

1990-91 Recession

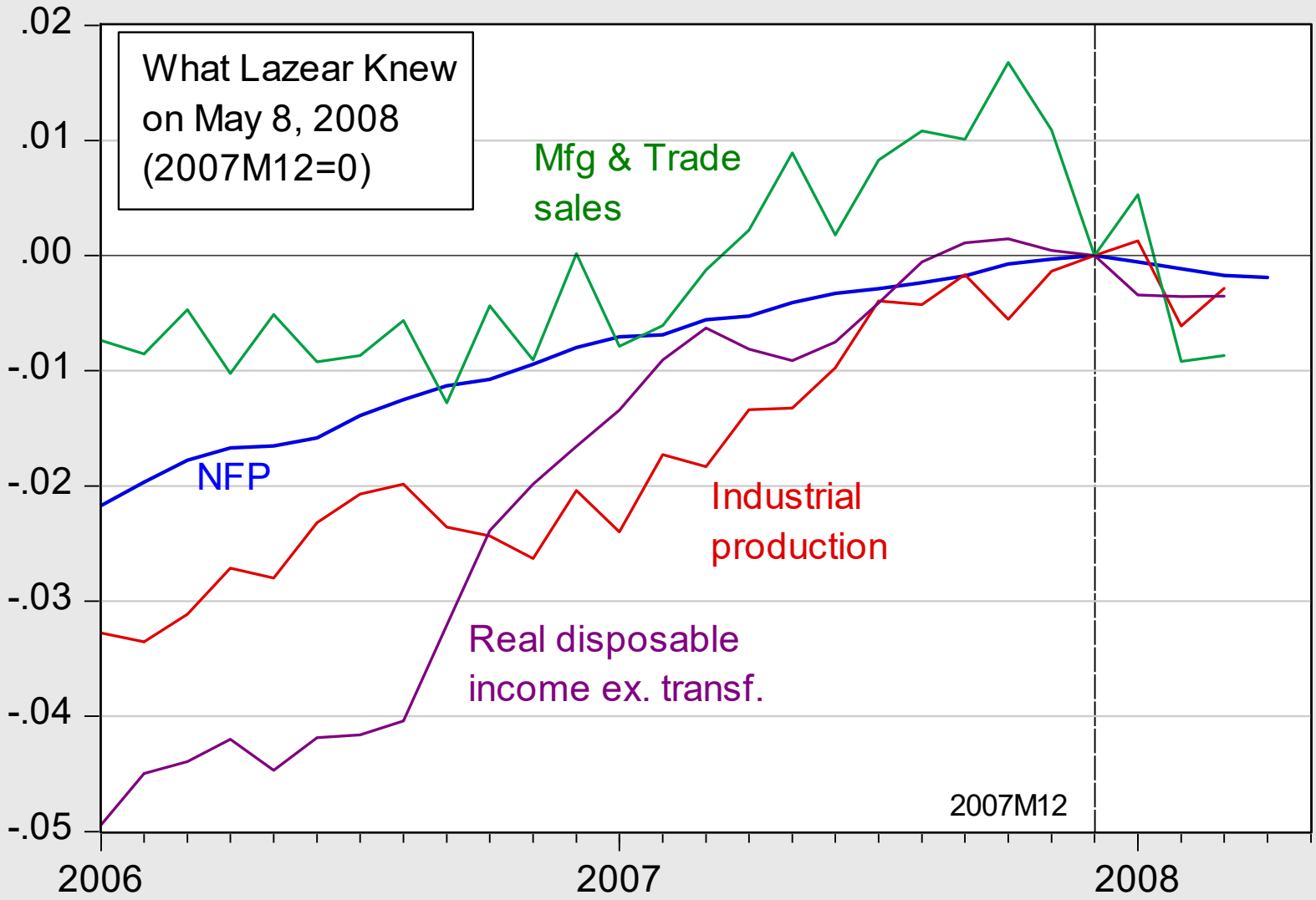


Recessions Are Hard to See in Real Time

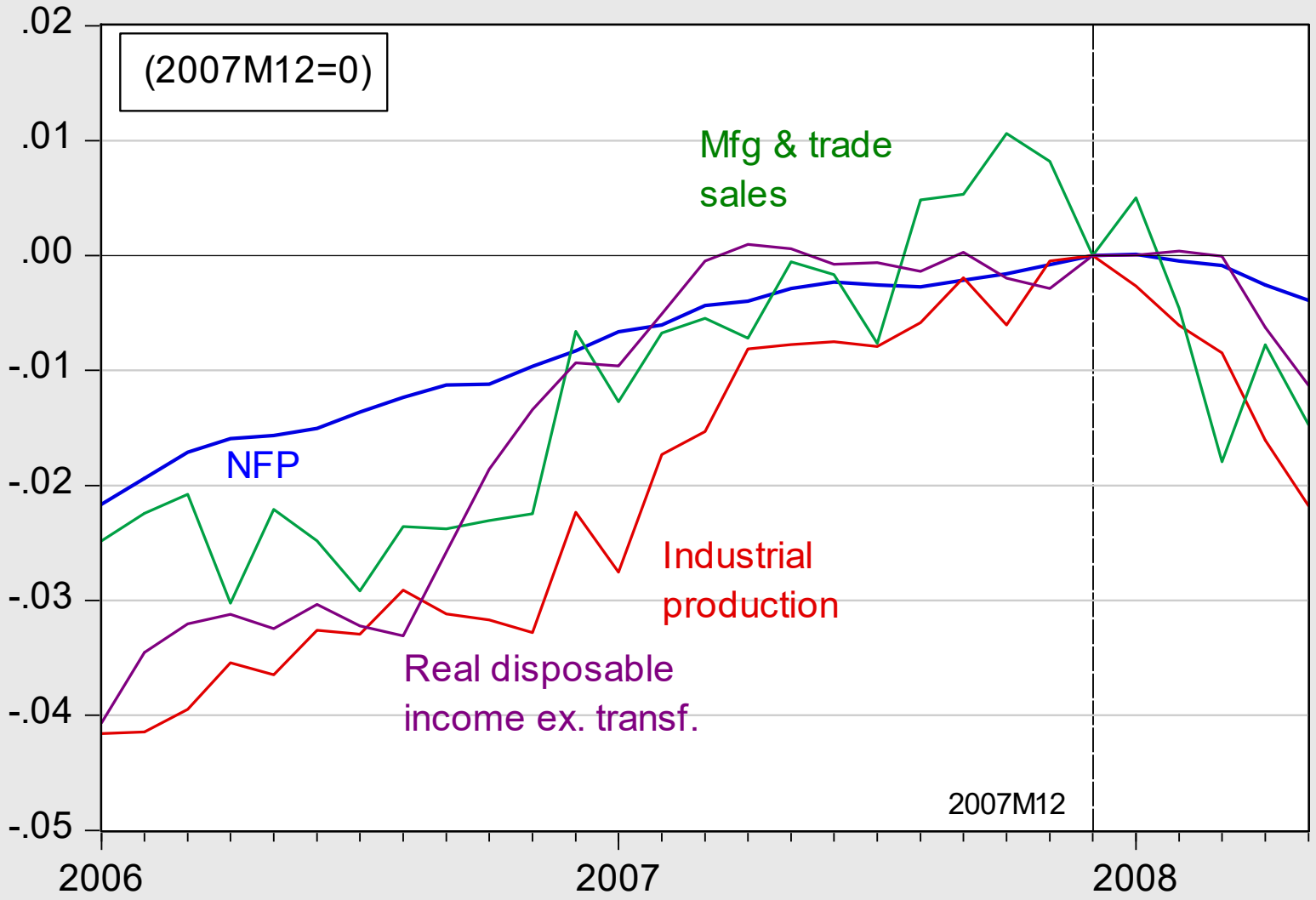
"The data are pretty clear that we are not in a recession."

-- White House Council of Economic Advisers Chairman Ed Lazear, Wall Street Journal, May 8, 2008

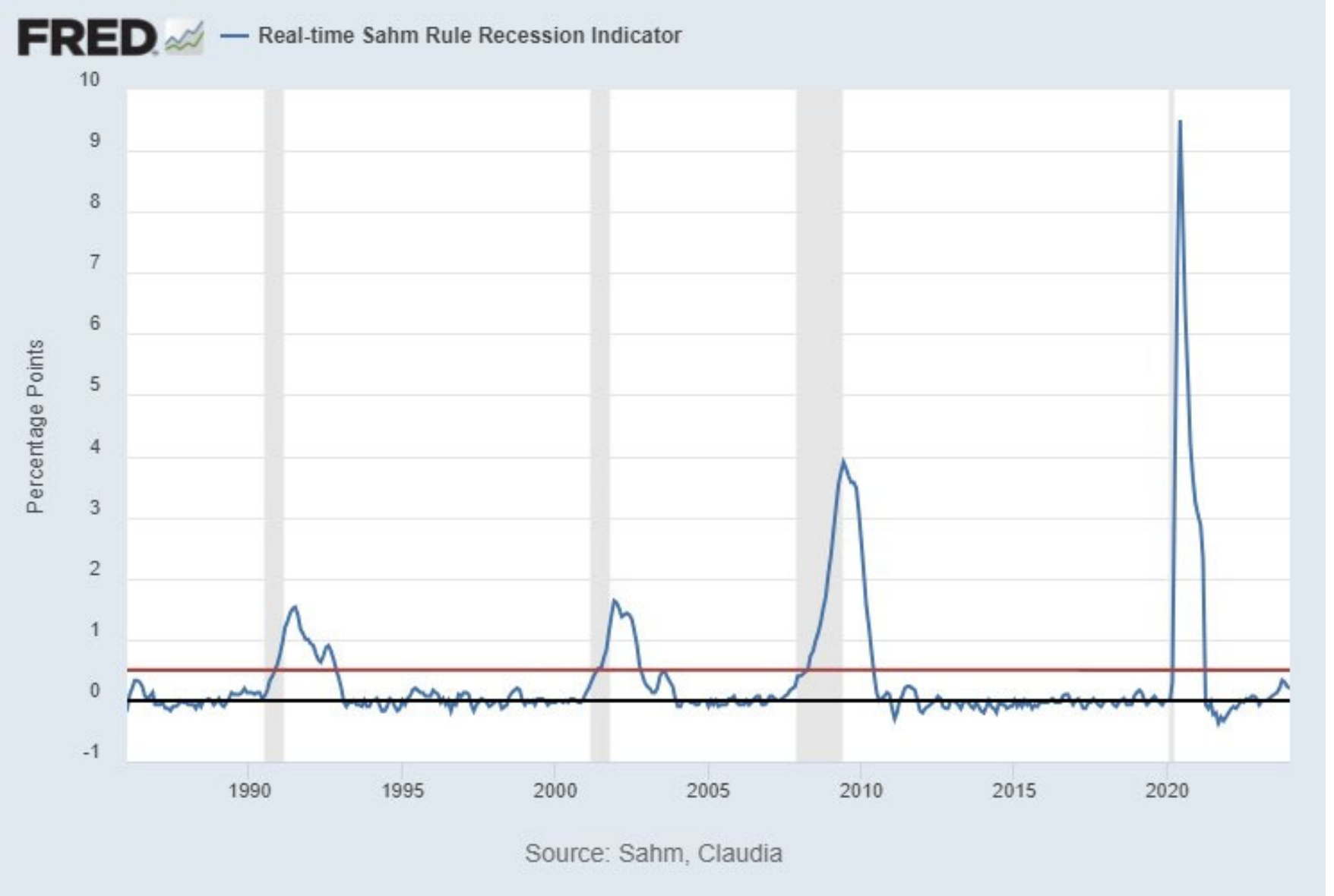
2007-2009 Recession (in real time)



What We Know Actually Happened



Do We Have a Good Real-Time Indicator:“Sahm Rule”



https://fred.stlouisfed.org/series/SAHMREALTIME

“Sahm Rule”

Sahm Recession Indicator signals the start of a recession when the three-month moving average of the national unemployment rate (U3) rises by 0.50 percentage points or more relative to its low during the previous 12 months.

This indicator is based on "real-time" data, that is, the unemployment rate (and the recent history of unemployment rates) that were available in a given month. The BLS revises the unemployment rate each year at the beginning of January, when the December unemployment rate for the prior year is published. Revisions to the seasonal factors can affect estimates in recent years. Otherwise the unemployment rate does not revise.

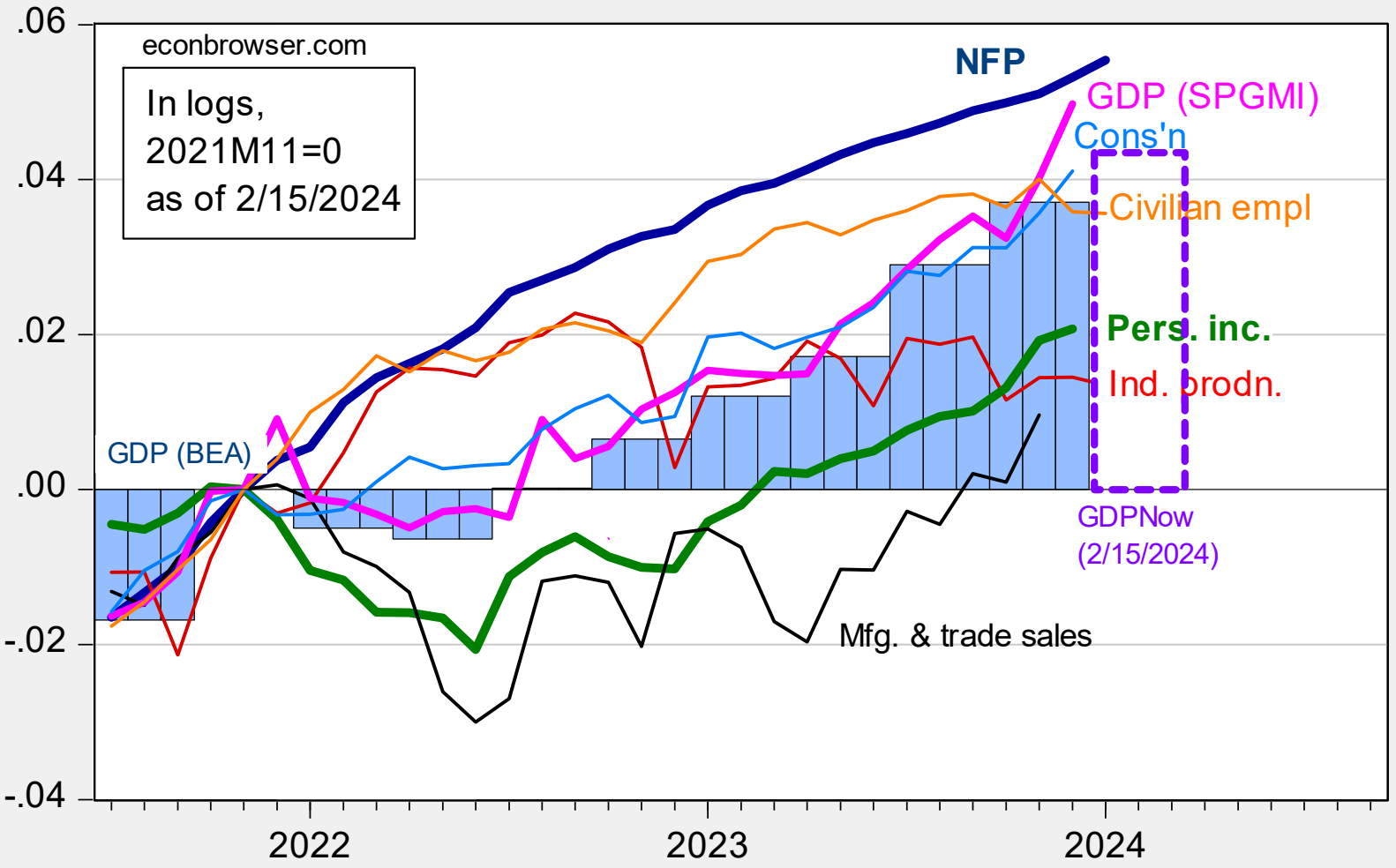
Suggested Citation:

Sahm, Claudia, Real-time Sahm Rule Recession Indicator [SAHMREALTIME], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SAHMREALTIME, September 27, 2020.

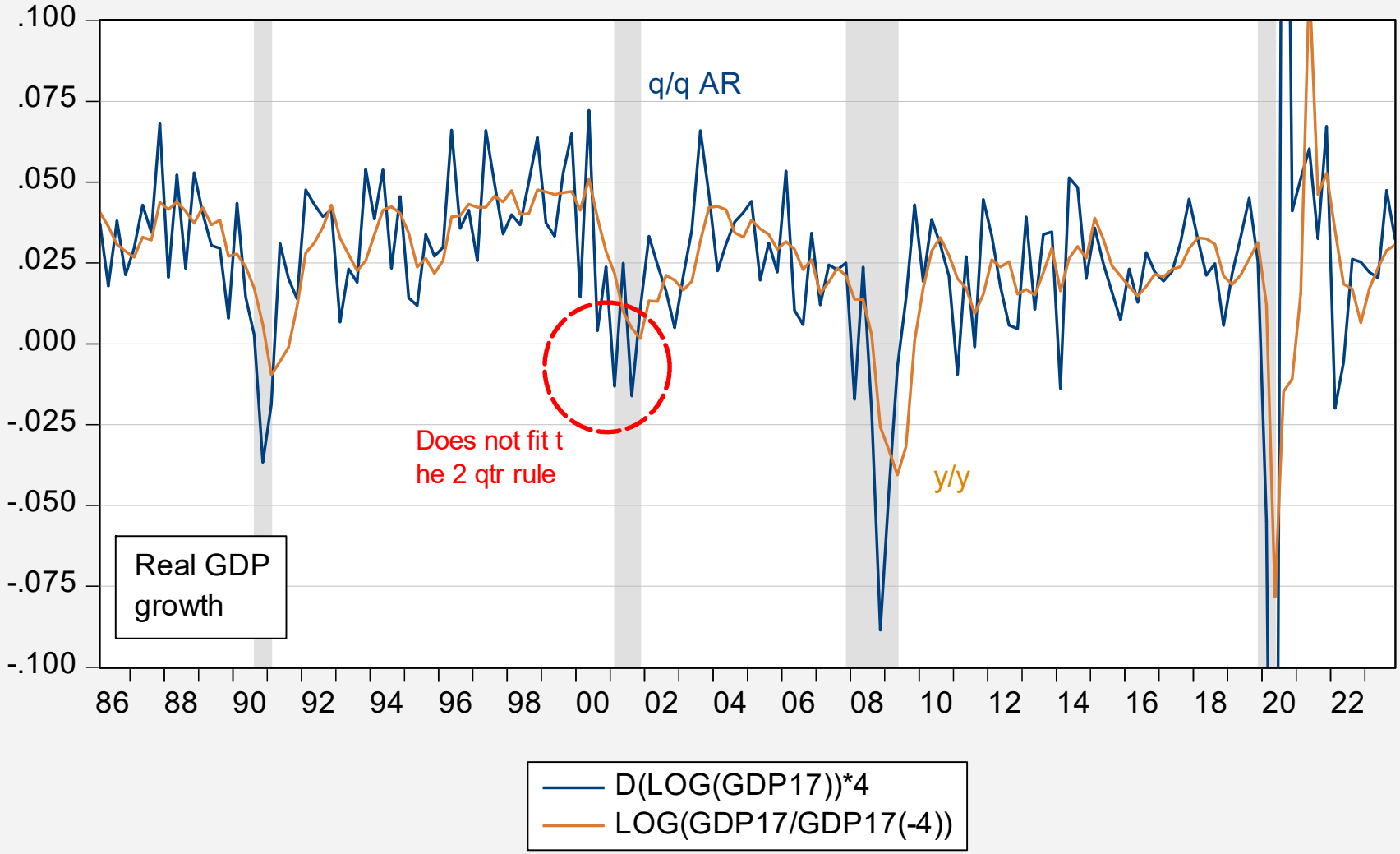
On Recession Pronouncements

- As of May 8th, April UE had breached Sahm rule threshold
- Ed Lazear should’ve hedged, had he known of the Sahm rule

Where Are We Now (as far as we know)?



Why We Don't Use the 2 Quarter GDP Decline Rule of Thumb…



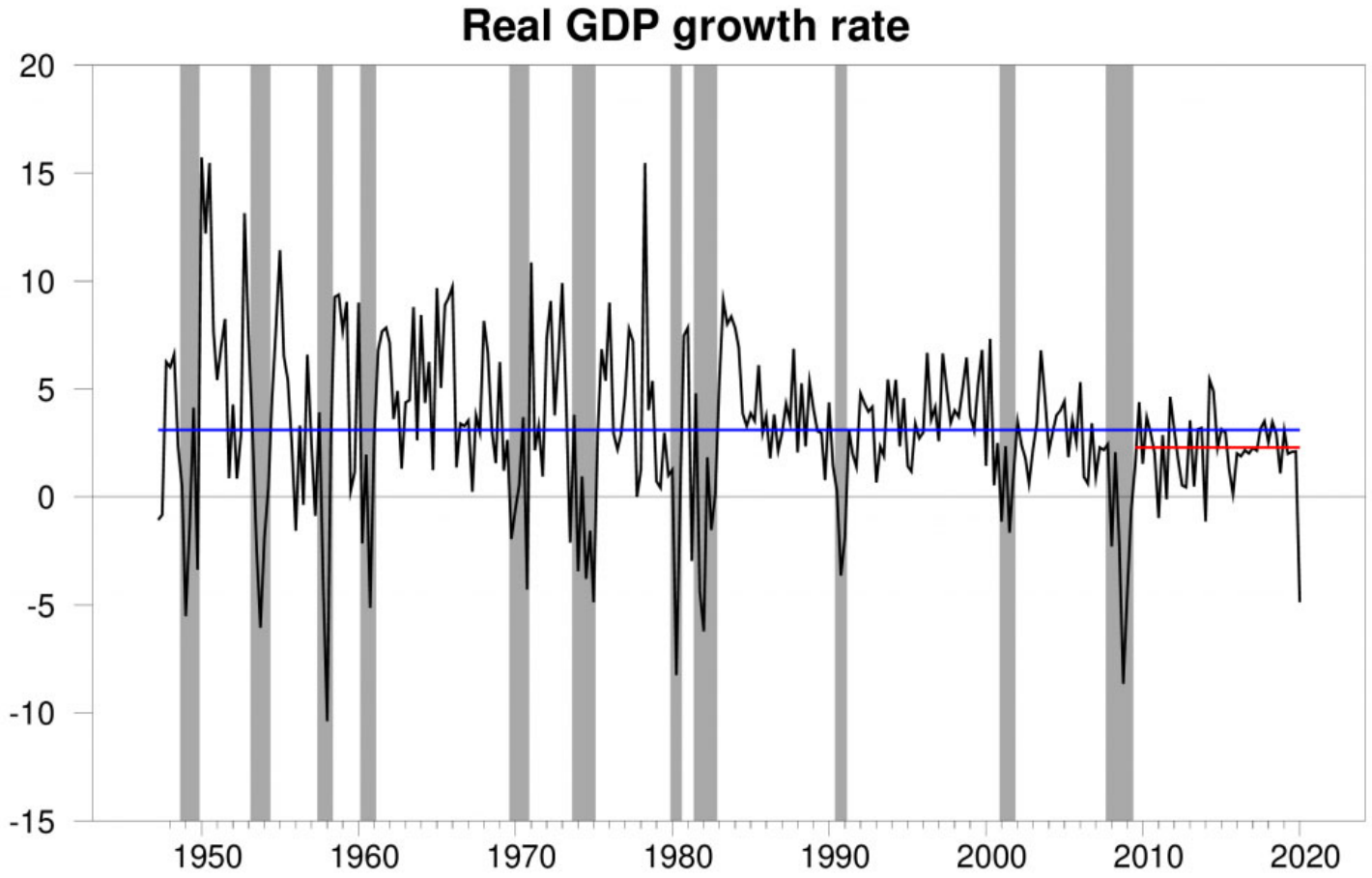
Statistical Approach: Is Economy in Upswing or Downswing

- James Hamilton uses a Markov switching model to characterize economy in two regimes
- High growth and low growth
- Using GDP as released
- Does not *predict* recession
- Is a slightly lagging indicator (e.g., Q3 growth is announced end-of-October)
- Is included in St. Louis Fed FRED

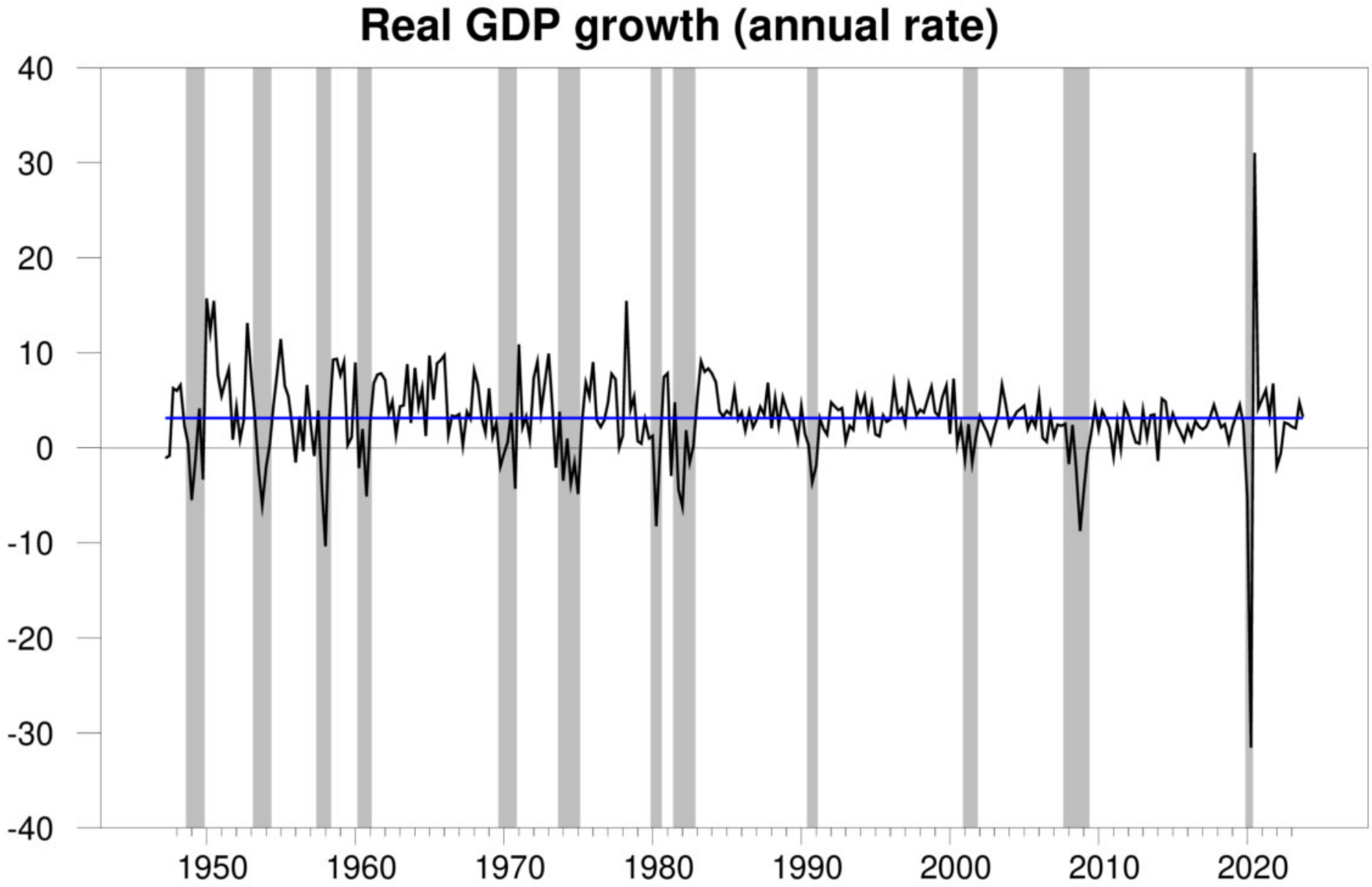
https://fred.stlouisfed.org/series/JHDUSRGDPBR

Hamilton Model in Last Recession

- As of the Q1 advance release (April 29), Markov switching model gives 32.5% probability of being in recession regime



Hamilton Model Today



https://econbrowser.com/archives/2024/01/another-solid-gdp-report-2

Recession in Europe

- Just announced yesterday by CEPR (Centre for Economic Policy Research) in London and EABCN (Euro Area Business Cycle Network)
- Why non-governmental organizations typically declare recessions? Because governments don't typically want to announce bad news
- Why wait until now (NBER declared recession in June)? Because drop could've been so short as to not merit being termed a recession

Announcement of November 10, 2023

Thus, despite a number of adverse shocks, the euro area has not experienced a decline in aggregate economic activity through the middle of 2023, let alone the type of significant decline that would qualify as a recession. Still, the overall pattern in recent quarters has been stagnant, with little movement across sectors or components of domestic final expenditure.

https://cepr.org/about/news/latest-findings-cepr-eabcn-euro-area-business-cycle-dating-committee-eabcdc-november

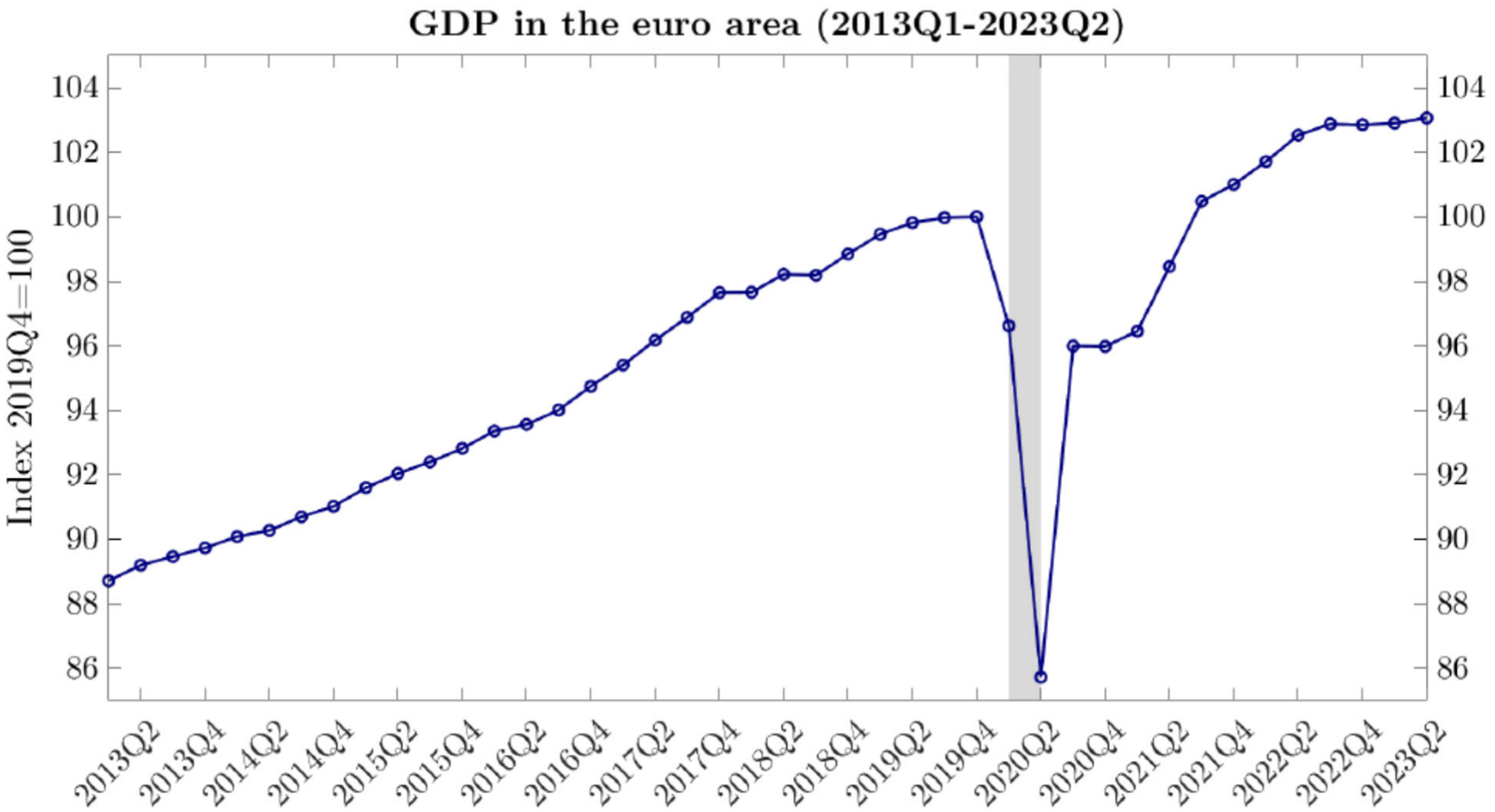
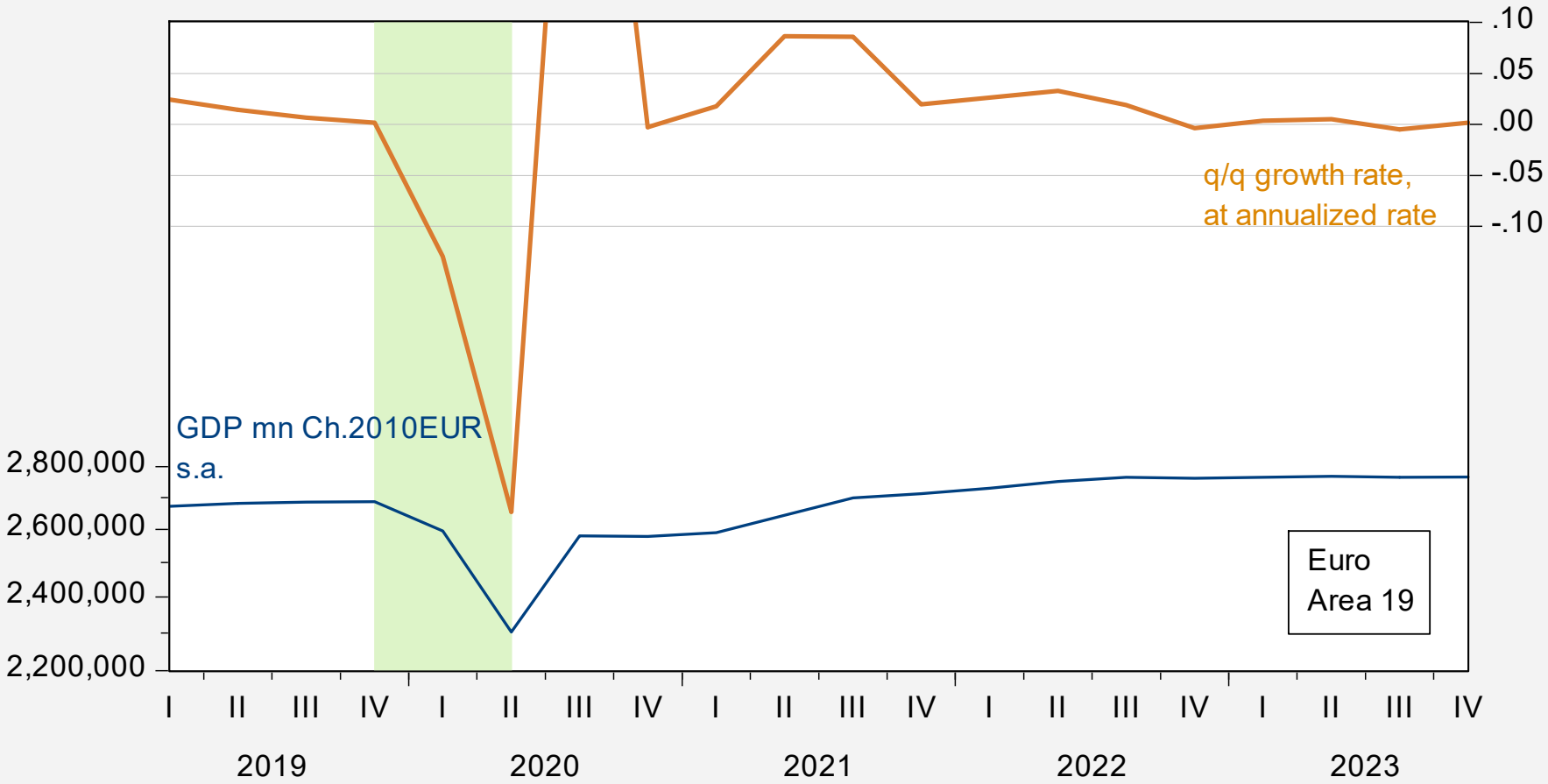


Figure 1. GDP at market prices. Chain-linked volume index, base 2019Q4=100. The data are seasonally and calendar adjusted. Grey bands are recessions (peak excluded) as dated by the Committee. *Source:* [Eurostat]

Updated to Q4



Employment

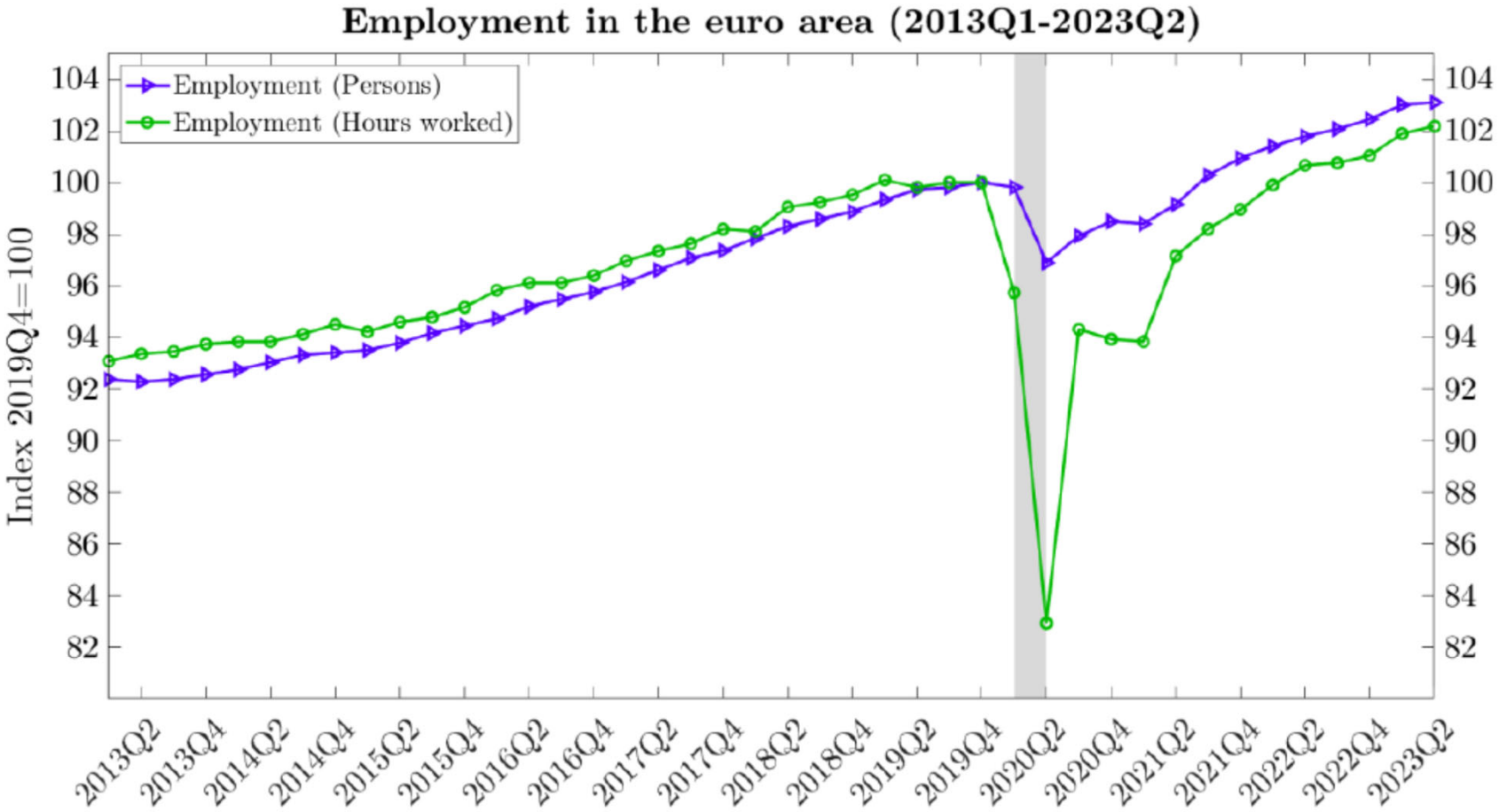


Figure 3. Employment covering all persons engaged in some productive activity within the production boundary of the national accounts. Quantity indices, base 2019Q4=100. The data are seasonally and calendar adjusted. Grey bands are recessions (peak excluded) as dated by the Committee. *Source:* [Eurostat]

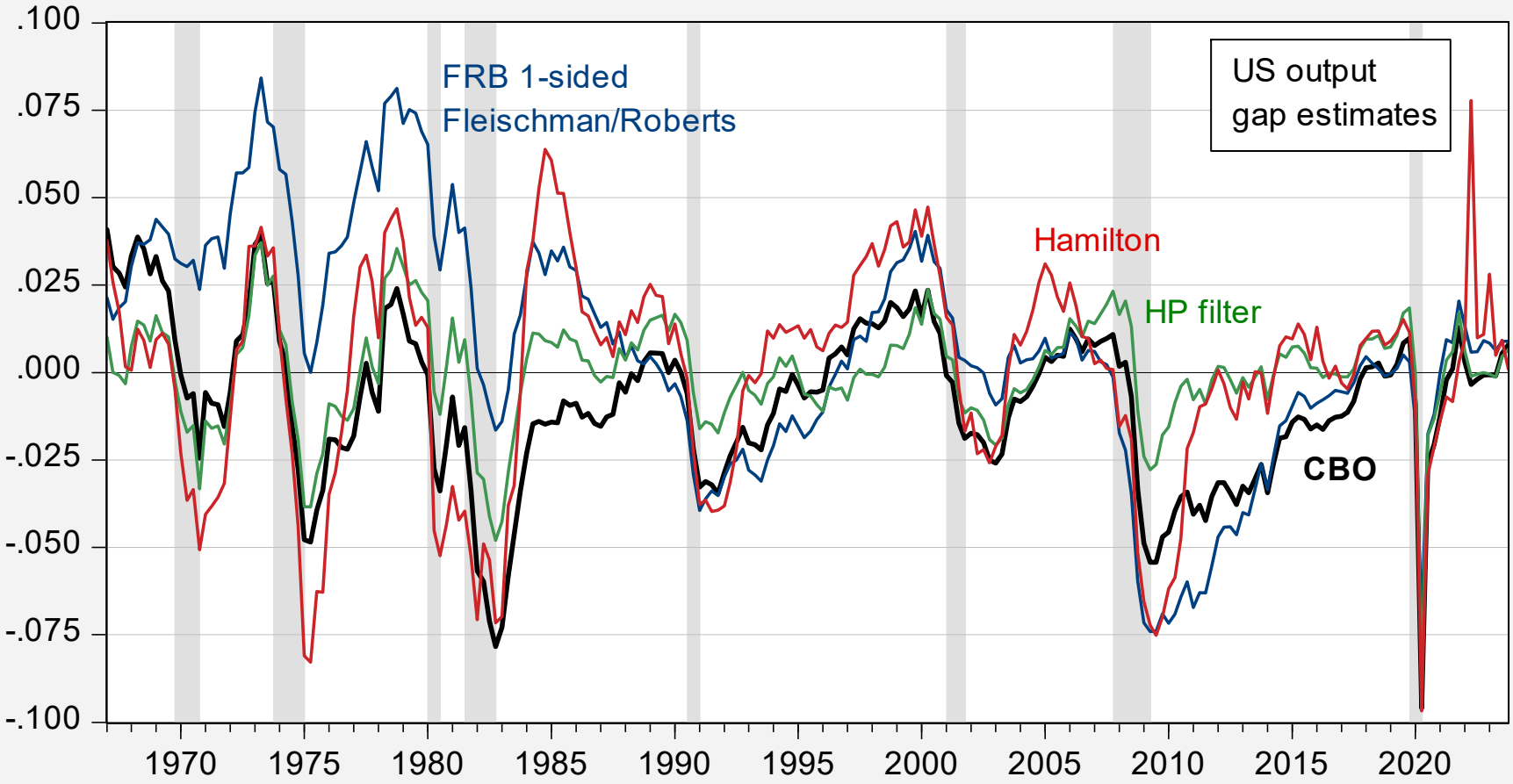
How to Model Output Gap?

- Output gap suggests using time series methods, in some sort of trend-cycle decomposition
- Estimate potential GDP using production function approach, projecting (as in CBO) potential GDP estimate using labor stock, demographics, capital stock, technology.

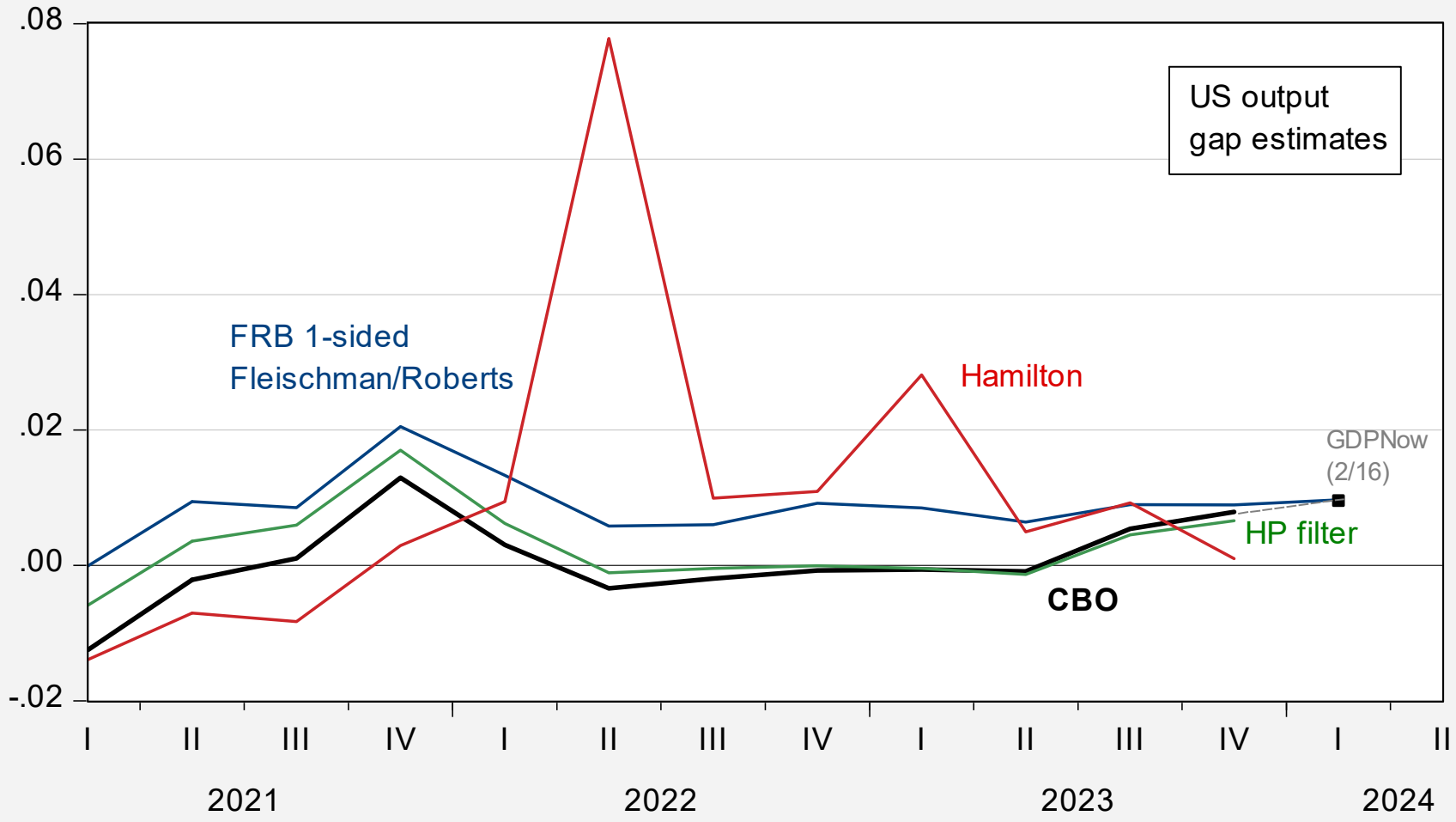
Trend-Cycle Decomposition

- Can extract trend, cycle using filter (linear deterministic trend, Hodrick-Prescott filter).
- Can extract trend, cycle using more complicated methods assuming correlation, no correlation between trend, cycle.

Gaps – Statistical vs. Production Fn.



Output Gap Estimates-Detail



Example: Hodrick-Prescott

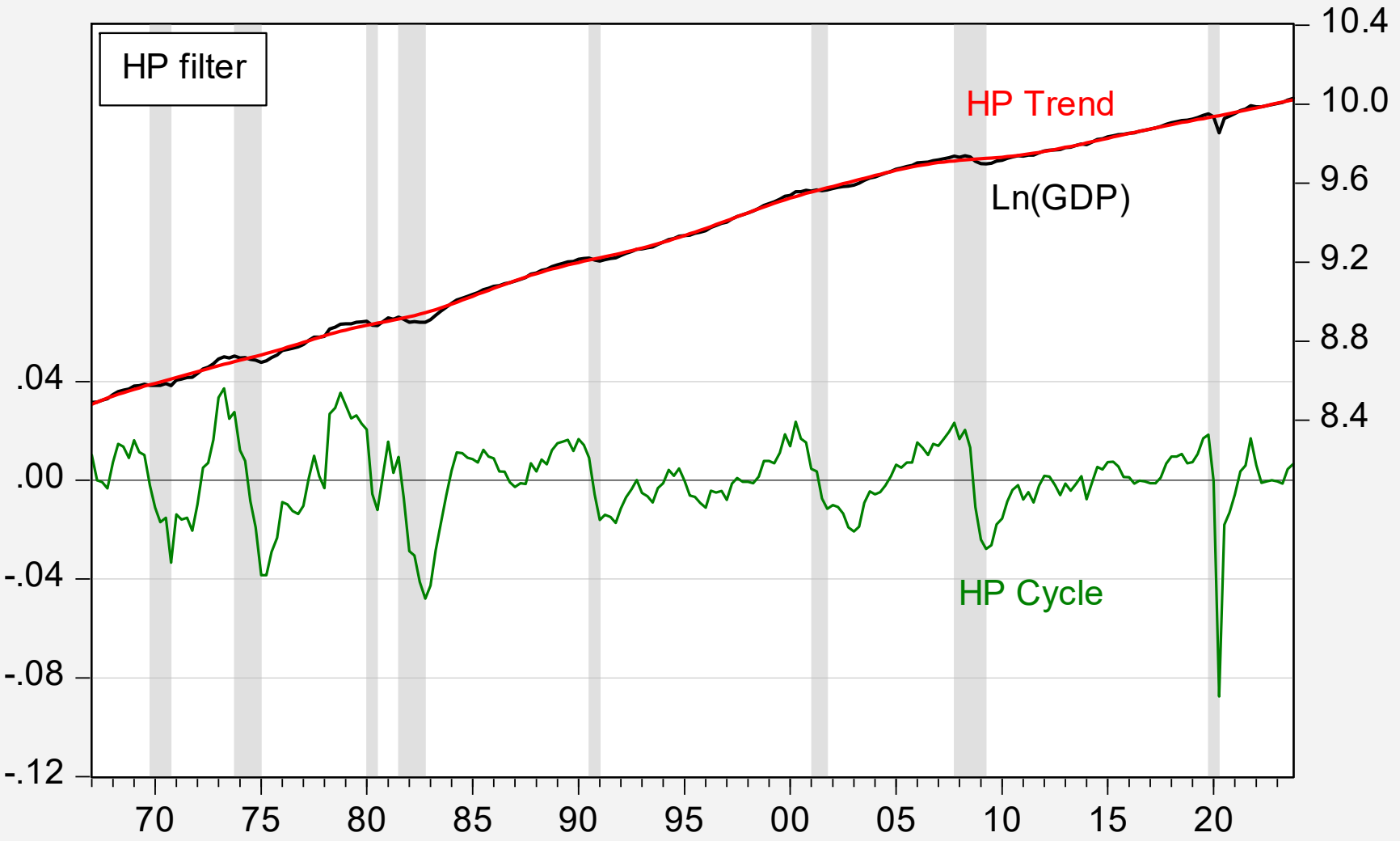
- The most common filter used in macroeconomics
- Not necessarily a “good” filter as it can impart common cycles into series that don’t have common cycles
- But it’s easy to implement: Assume

$$y_t = \tau_t + c_t + \epsilon_t$$

Pick λ

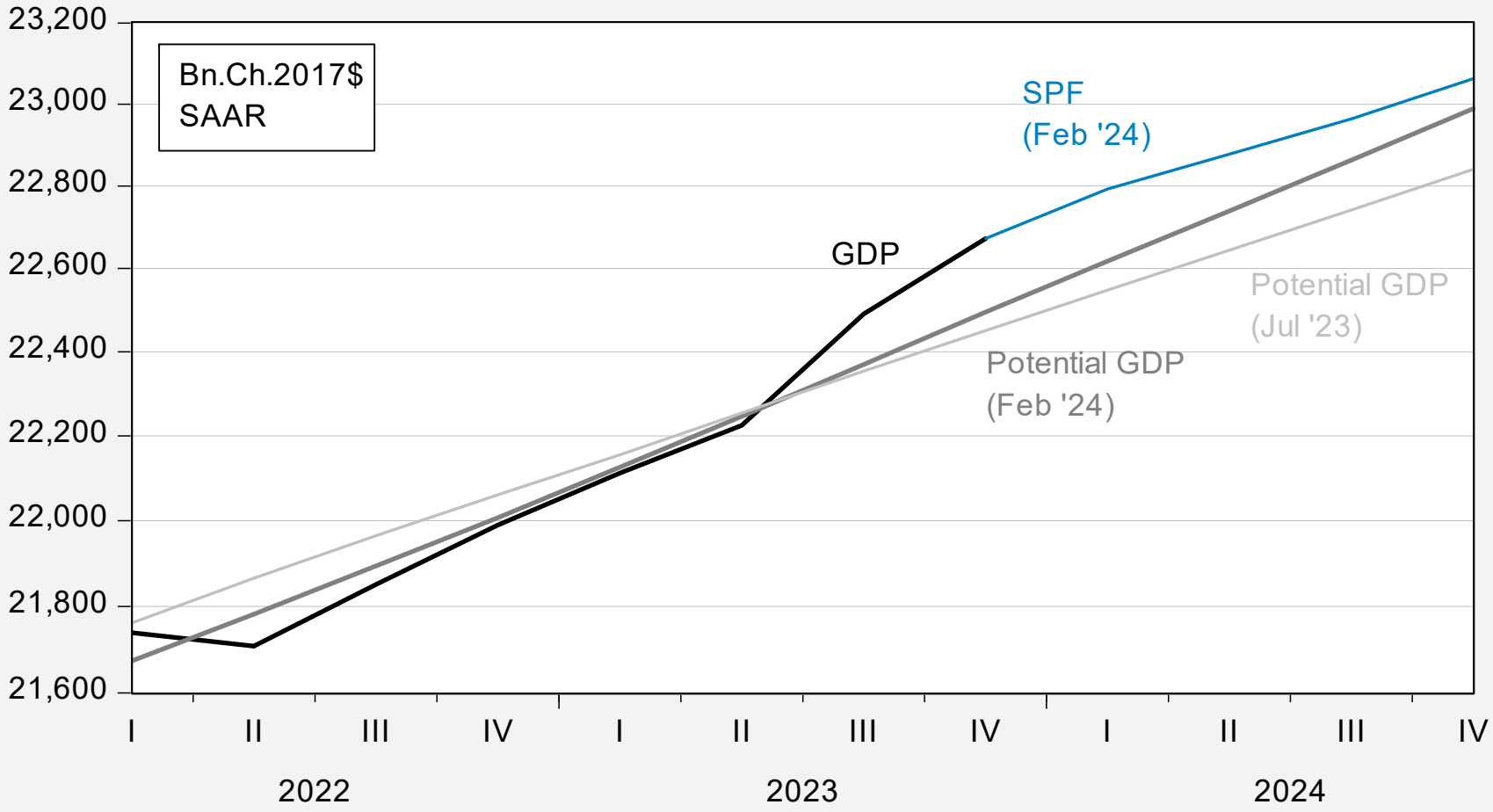
$$\min_{\tau_t} \left[\sum_{t=1}^{T} (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} \{(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})\}^2 \right]$$

Hodrick Prescott Filter on log GDP



Note: endpoint problem

Gaps – Production Function Approach



How to Estimate Potential GDP

- Shackleton, "Estimating and Projecting Potential Output Using CBO's Forecasting Growth Model," WP 2018-03

$$(1)\ GDP_x = QGDP_x \times PGDP_x$$

$$(2)\ GDP = GDP_{nfb} + GDP_{farm} + GDP_{house} + GDP_{nonprofits} + GDP_{federal} + GDP_{s\&l}$$

$$(3)\ QGDP_{nfb} = A_{nfb} \times ILAB_{nfb}^{(1-\alpha)} \times ICAP_{nfb}^{\alpha}$$

where

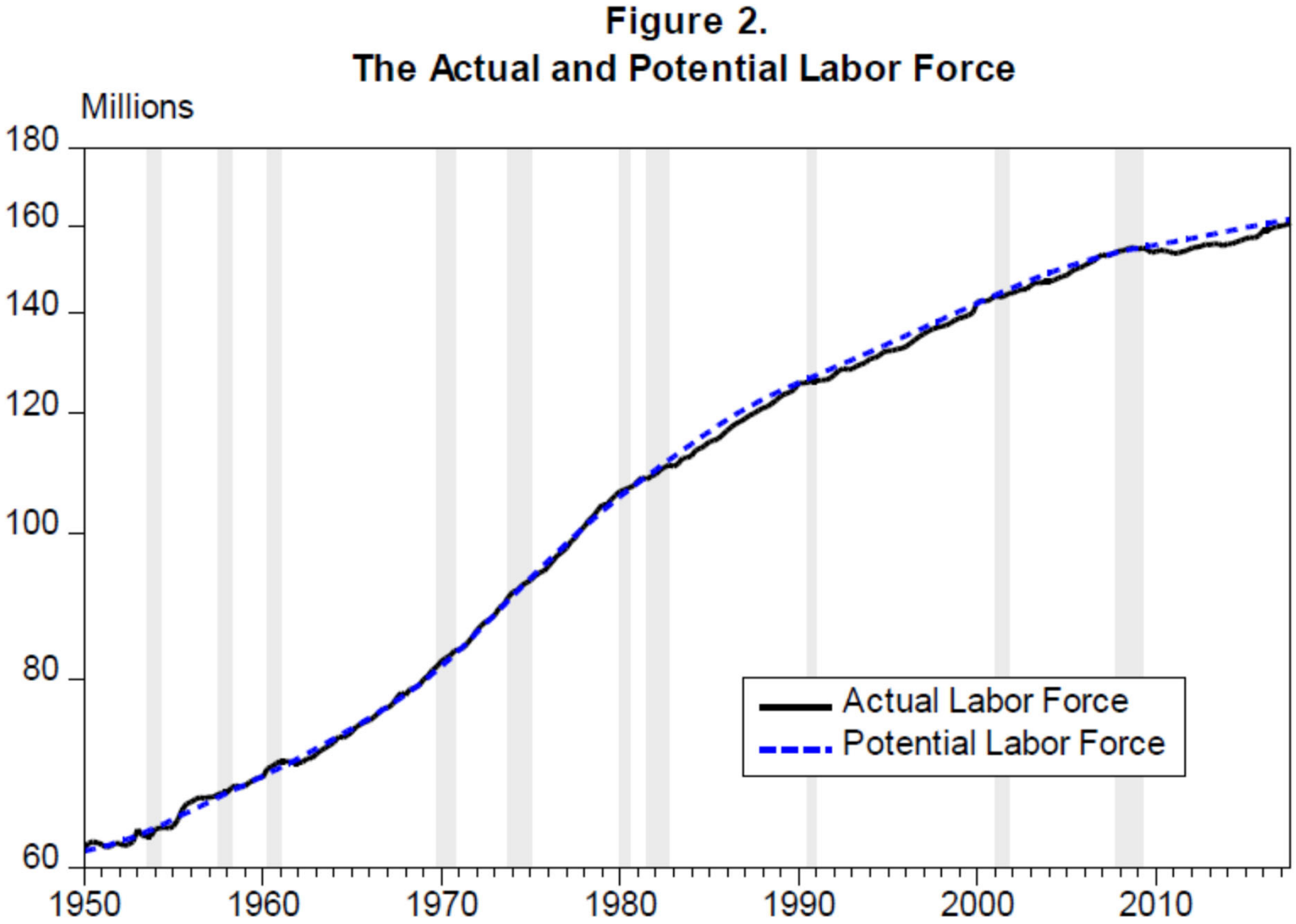
$QGDP_{nfb}$ = real GDP in the nonfarm business sector;
A_{nfb} = an index of total factor productivity in the sector;
$ILAB_{nfb}$ = an index of hours worked in the sector;
$ICAP_{nfb}$ = an index of capital services in the sector; and
α = a parameter that characterizes the relative contributions of labor and capital in the sectoral production process.

Biggest Challenge: Output of NFB

Table 1.
Structure of CBO's Forecasting Growth Model

Sector	Inputs			Percentage of GDP
	Labor	Capital	Productivity	
Nonfarm business	Labor hours	Services from multiple types of capital	Total factor productivity	75
Farm	Labor hours	--	Labor productivity	1
Household	--	Services from owner-occupied housing	--	7
Nonprofit	Labor hours	--	Labor productivity	5
Federal government	Labor hours	Aggregate depreciation	Labor productivity	4
State and local government	Labor hours	Aggregate depreciation	Labor productivity	8

Labor (which has to be projected)



Need to Project Capital Services and Technology (TFP)

- Capital services depends on capital stock, which depends on the amount of investment and depreciation.
- Amount of investment depends on contemporaneous economic conditions (so not a complete separation of cyclical, natural)
- TFP is extremely difficult to estimate (since it's the Solow residual)
- And even harder to project (since we don't know what causes it to change)

Conclusions

- Recessions are declines in economic activity
- Output gaps are deviations of output from potential GDP (natural rate of output)
- Which one is more important? Latter for our models.